4.11. Sewage Facility Management

Management Measure for Sewage Facilities:

Install pumpout, dump station, and adequate restroom facilities at marinas to educe the release of sewage to surface waters. Design these facilities to allow ease of access, and post signage to promote use by the boating public.

Management Measure Description

Boat sewage can be a problem when discharged into surface waters without pretreatment. It is similar to situations in which discharges of municipal sewage close beaches when heavy rainstorms overburden sewer systems and rainwater mixed with raw sewage is discharged directly to surface waters through combined sewer overflows. Sewage from boats is more concentrated than that from either combined sewer overflows or sewage treatment plants because marine heads use little water for flushing and the sewage in marine heads is not diluted by water from bathing, dishwashing, or rain. Boat sewage contains nutrients that can stimulate growth of aquatic plants (algae and large aquatic plants) and pathogens (fecal coliform bacteria and viruses), which can cause human health problems directly through contact in the water or indirectly through the consumption of contaminated seafood.

Progress has been made toward eliminating discharges of sanitary waste from boats with the designation of no discharge zones, installation of pumpouts nationwide, and growing number of boater education programs. Efforts to reduce sewage discharges and to educate boaters about the damage they cause need to continue, and marinas can play a direct and important role in these matters.

Pumpout facilities and restrooms should be installed at new marinas and, where feasible, at existing marinas. Most states encourage the installation and use of pumpouts through the federal Clean Vessel Act (CVA) Grant Program and boater education.

Boaters and marinas are usually not considered primary sources of pathogen contamination in surface waters. Measurements of fecal coliform (*Escherichia coli)* bacteria are used as an indicator of sewage contamination in surface waters. It is often hard to attribute high coliform bacteria levels directly to any particular source, and within an area many potential sources are often present. Background coliform levels from runoff polluted with pet waste and droppings of waterfowl can be high, septic systems in an area might be poorly maintained or operating improperly, municipal sewage systems might have leaks, and boaters in marinas might be discharging untreated or insufficiently treated waste into surface waters. This management measure addresses all potential sources of sewage pollution to surface waters. Boaters and marinas, in particular, have a vested interest in clean waters, because the livelihood of marinas and the recreational benefits boaters derive from use of the waters are clearly linked to clean water.

Type I and II marine sanitation devices (MSDs) are used to pretreat boat sewage before discharging it overboard (except in a no discharge zone) if not prohibited by local ordinances. In an area designated as a no discharge zone, MSDs of all types must be configured to prevent discharge to surface waters and all sewage must be pumped out. Type III MSDs are holding tanks. They must be emptied into sewage treatment systems and cannot be discharged overboard. It is strongly recommended that holding tanks equipped with Y-valves have the valves in the closed position to prevent accidental discharge into boating waters. Pumpout use and no discharge zone designations have improved

water quality in many areas, so that shellfishing and aquaculture, once prohibited because of high bacterial concentrations, are allowed again. A description of the types of MSDs is provided in Section 3.

Chemicals are used in holding tanks to retard the normal aerobic digestion of sewage and release of noxious odors. Some concern has been expressed about the effect that these chemicals might have on municipal sewage treatment systems (that is, the possibility of interfering with bacterial digestion in the first stages of sewage treatment) when boater sewage is transferred to a municipal sewage system. Studies of this effect have found that neither the chemicals nor the concentration of marine wastes is a problem for any properly operating public sewage treatment plant.

Two of the most important factors in successfully preventing sewage discharge from boats are providing adequate and reasonably available pumpout facilities and conducting a comprehensive boater education program. Congress passed the Clean Vessel Act (CVA) in 1992 to help reduce pollution from vessel sewage discharges by providing funding to states for the installation of adequate pumpout facilities (Figure 4-18). The act established a 5-year (1992–1997) federal grant program administered by the U.S. Fish and Wildlife Service that authorized funding from the Sport Fish Restoration Account of the Aquatic Resources Trust Fund for use by states. The act was renewed for a second 5-year period in 1998. Grants are available from the CVA grant program to both private and public marinas for the construction, renovation, operation, and maintenance of pumpout stations and waste reception facilities. Further information about CVA grants and the grant program is available at the U.S. Fish and Wildlife web site at <http://fa.r9.fws.gov/cva/cva.html>.

Applicability

This management measure is applicable to marinas where adequate pumpout, dump station, and restroom facilities do not exist.

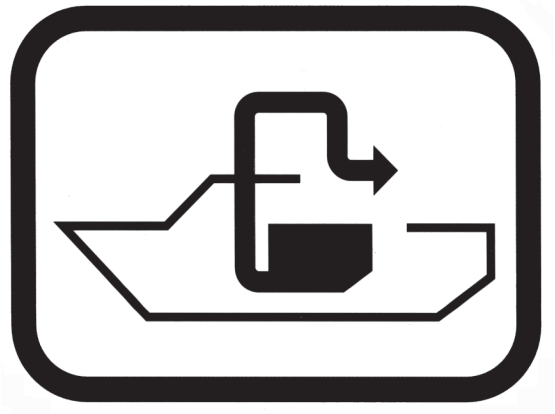

Figure 4-18. Pumpout station logo (Clean Vessel Act).

Best Management Practices

♦ *Install pumpout facilities and dump stations. Use a system compatible with the marina's needs.*

Three types of onshore sewage collection systems to handle sewage from boat holding tanks and portable toilets are available—fixed point systems, portable/mobile systems, and dedicated slipside systems (Figure 4-19).

- Fixed-point systems.

Fixed-point collection systems include one or more centrally located sewage pumpout stations. The stations are usually located at the end of a pier, often on a fueling dock, so that fueling and pumpout operations can be done at the same time. A boat that needs pumpout service moves to the pumpout station; a flexible hose is connected to the wastewater fitting in the hull of the boat; and pumps or a vacuum system move the wastewater to an onshore holding tank, a public sewer system,a private treatment facility, or another approved disposal facility.

- Dump stations for portable toilets.

Where boats in a marina use only small portable (removable) toilets, a satisfactory disposal facility is a dump station, which is fundable with a CVA grant.

- Portable systems.

Portable/mobile systems are similar to fixed-point systems and in some situations can be used in

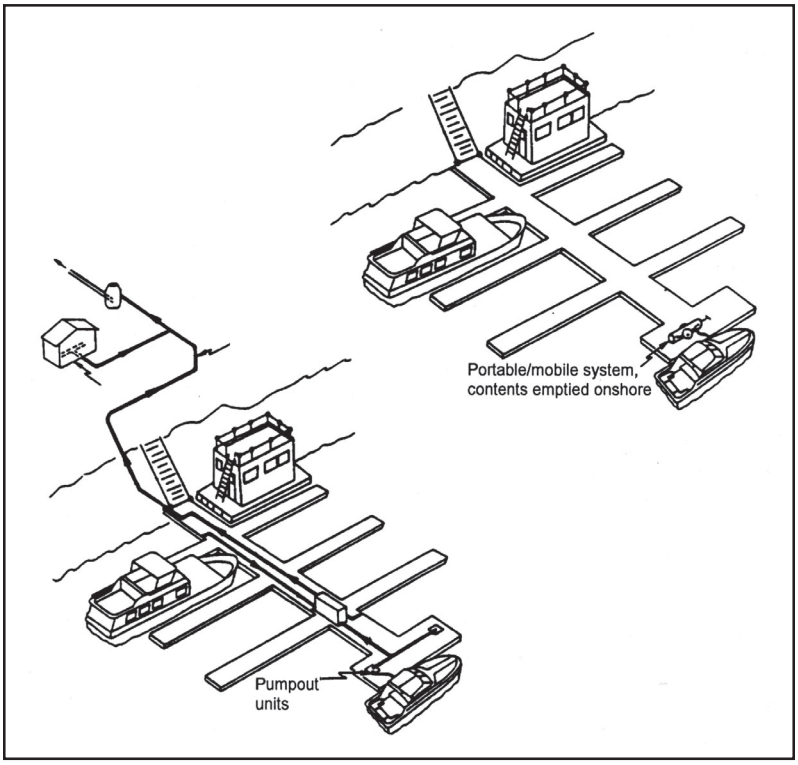

Figure 4-19. Examples of Pumpout systems

their place at a fueling dock. A portable unit includes a pump and a small storage tank. The unit is moved to a boat where the boat is docked. The unit is connected to the deck fitting on the vessel, and wastewater is pumped from the vessel's holding tank to the pumping unit's storage tank. When the storage tank is full, the portable unit is taken to a location where its contents can be discharged into a municipal sewage system or a holding tank for removal by a septic tank pumpout service.

Some marinas use a smaller mobile pumpout unit that does not have a holding tank attached but instead pumps directly from the boat, through a pump hose, and into a hose fitting in each slip that is connected to a below-dock, gravity-drained sewer pipe system.

Because boaters do not have to move their boats to a special location to use the systems and marinas do not have to install extensive dockside piping and pumping systems to provide pumpout service, portable pumpout facilities might be the most feasible, convenient, accessible, regularly used, and affordable way to ensure proper disposal of boat sewage.

Mobile systems have to be moved about a marina, and this factor should be considered when determining the correct type of system for a marina. One type of portable/mobile type of pumpout unit that is popular in the Great Salt Pond in Block Island, Rhode Island, is the radio-dispatched pumpout boat. The pumpout boat goes to a vessel in response to a radio-transmitted request, pumps the holding tank, and then moves on to the next vessel requesting a pumpout. This approach eliminates the inconvenience of lines, docking, and maneuvering vessels in high-traffic areas. Pumpout boats and mobile systems are also fundable with a CVA grant.

- Dedicated slipside systems.

Dedicated slipside systems provide continuous wastewater collection at select slips in a marina. Slipside pumpouts are particularly suited to liveaboard vessels, and dedicated slipside pumpout points can be provided to slips designated for liveaboards while the remainder of the marina is served by a fixed-point or mobile pumpout system.

In a dedicated system, direct connections are made between the boat and a below-dock gravity-drained sewer pipe system (Figure 4-20). This requires use of a vacuum-type pumpout system, which evacuates the entire line and the boat holding tank. The landside vacuum pumpout, which has its own holding tank, can discharge directly into a large inground holding tank or to a municipal sewer system.

♦ *Provide pumpout service at convenient times and at a reasonable cost.*

Use of pumpout stations increases if they are made available at times of day when customers want to use them. Pumpout availability during

Figure 4-20. Pumpout system at Hall of Fame Marina (Florida). Accommodating dozens of yachts more than 100 feet LOA, the marina's pumpout system includes below-dock sewer pipes and connectors of each slip (USEPA, 1996: *Clean Marinas—Clear Value).*

regular marina hours or when the fuel dock is also open (if the pumpout station is located next to the fuel station) has been found to work well. Pumpout stations should be available to all boats that are able to access them and cannot be restricted to marina members. Fees of up to $5 are federally allowed under the CVA grant program, and high fees often decrease pumpout use.

♦ *Keep pumpout stations clean and easily accessible, and consider having marina staff do pumpouts*.

Free pumpouts are certainly an attraction for customers, but cleanliness and ease of use are popular features as well. Customers are more likely to use pumpouts if they are kept clean and neat and directions for their use are clearly posted. Having a marina employee do pumpouts for patrons is a real service that patrons appreciate, especially if the staff person is skilled in use of the pumpout and is knowledgeable of the rules pertaining to marine sanitation devices (Figure 4-21). The ability of a pumpout station to attract new customers is magnified when pumpouts are free and done by marina staff.

♦ *Provide portable toilet dump stations near small slips and launch ramps.*

The vast majority of boats used in the United States are less than 26 feet in length, and more than half are less than 18 feet in length. Of those boats that have toilets onboard, most use portable units designed to be carried ashore for dumping into toilets. Boaters on these boats can be encouraged to dispose of their waste properly by providing portable toilet dump stations. The stations can be placed on docks or land where they are convenient to use and can be kept clean. Marinas should consider making at least one dump station available, even if the marina caters primarily to large boats. Public launch ramps should offer dump stations where feasible.

Figure 4-21. Management at Battery Park Marina (Ohio) found that most customers are willing to pump fuel but not their sewage. Dock staff at the marina, therefore, pump out the boats. Customers also often prefer to make a single stop for both fuel and a pumpout, and marinas that have made it convenient for boaters to do this (such as Battery Park Marina and Kean's Detroit Yacht Harbor in Michigan) have found that the arrange-ment leads to an increase in the volume of fuel sales as well as customer satisfaction (USEPA, 1996: *Clean Marinas—Clear Value).*

♦ *Provide restrooms at all marinas and boat ramps.*

Clean, dry, brightly lit restrooms in marinas are generally used in preference to boat toilets, especially if easy to access. Restrooms are the best way to reduce boat toilet use and thus decrease the potential for overboard discharge of untreated sewage. Where feasible, restrooms should be provided for those who use boat launch ramps. Restrooms are also an amenity that can increase user satisfaction.

♦ *Consider declaring marina waters to be a "no discharge" area.*

Federal law prohibits discharge of any untreated sewage into all territorial waters, including coastal waters to the 3-mile territorial limit, and inland waters of the Nation, but does allow use of Coast Guard-approved MSDs (Types I and II). A private marina that is not in a federal or state-designated no discharge zone may prohibit sewage discharges within the marina basin, if desired, with the addition of a clause to the slip rental contract stating that sewage discharge is not permitted (Figure 4-22). An attorney can add the appropriate language. Marina-specific no discharge policies will work if conditions are similar to those necessary to make federal or state-designated NDZs effective:

- Provision of adequate restroom facilities for marina patrons.
- Convenient and low-cost or free pumpout service at the marina.
- Adequate boater education.
- Signs that declare the marina's policy of no discharge.

This is **NO DISCHARGE** marina.
Please use our clean restrooms.
Pumpout service is free to customers.
Please do your part to keep our water clean.

Figure 4-22. An example of a sign declaring a "no discharge" marina.

- Contract language that is legally sufficient and easy to understand.
- Visible enforcement.

♦ *Establish practices and post signs to control pet waste problems.*

Many boats have dogs aboard, and the animals need an area to relieve themselves. The best way to control pet sewage is to provide a special area away from the shore for dogs to be taken and ask owners to clean up after their pets (Figure 4-23). A grassy area that is away from where people walk or children play is ideal.

♦ *Avoid feeding wild birds in the marina.*

The popular practice of feeding wild ducks, geese, swans, and seagulls around the docks attracts more birds and encourages all of them to become long-term residents at the marina. Such residential flocks can contaminate water, foul docks, and create a mess on boats. The best way to reduce this water pollution source is to prohibit people from feeding the birds.

The largest marina in the world, Marina Del Rey (California), is owned and operated by the County of Los Angeles. The county was forced to close one of its popular family bathing beaches for more than a year because of high fecal contamination in the water. Extensive tests proved that the source of the pollution problem was seagulls that spent the night on the beach, not boat sewage. Within days of stringing monofilament lines over the beach to discourage bird visits, water quality improved dramatically and the beach was eventually reopened.

♦ *Establish no discharge zones to prevent any boat sewage from entering boating waters.*

Every state has some no discharge boating waters that prohibit release of any treated or untreated sewage from all boats and vessels. No discharge zones (NDZs) are established specifically to control discharges of sewage from boats. Establishing an NDZ does not imply that other discharges, such as those from municipal sewage treatment facilities, industrial facilities, combined sewage outfalls, septic tanks, and nonpoint source runoff do not enter the waterbody. These sources

Figure 4-23. Elliott Bay Marina (Washington) solved the problem of dog droppings on its docks by providing free disposable plastic bags for owners to use to clean up after their pets. This inexpensive solution freed staff from having to clean the grounds of dog droppings periodically and virtually eliminated complaints from other boaters (USEPA, 1996: *Clean Marinas—Clear Value).*

are addressed by other permitting and regulatory programs.

EPA regulations define two types of NDZs—those that are NDZs by nature of their geography and those that can be designated by EPA and states. Waterbodies of the first type include freshwater lakes and reservoirs, and other freshwater impoundments whose entrance and exit points do not support traffic by the regulated vessels, i.e., by vessels with installed toilets. Rivers that do not support interstate vessel traffic are also NDZs by this rule. Waterbodies of the second type (that can be designated as NDZs by EPA or states) include coastal waters and estuaries, the Great Lakes and their interconnected waterways, and other flowing interstate waters that are navigable by vessels with installed toilets. Since 1975, when EPA approved the first state application for a no discharge zone, many states have established NDZs. Some states, including Michigan, Missouri, New Mexico, and Rhode Island, have designated all their waters as no discharge zones (Table 4-4). Most of Lake Michigan and Lake Superior have been declared to be NDZs.

A no discharge designation is particularly applicable to inland lakes and reservoirs where flushing may be limited, primary contact recreational activities (e.g., swimming, windsurfing) are popular, and surrounding homes might use on-site septic systems for sewage treatment. The CVA provides grants to coastal and inland states for pumpout stations and waste reception facilities to dispose of recreational boater sewage. A listing of existing no discharge zones is presented at the end of this management measure discussion.

For a no discharge designation to be successful, three key elements are necessary:

- Pumpout services in the area declared to be an NDZ should be reasonably available when customers need them and adequate for the number of boaters in the area.
- Boaters should be educated about the purpose and importance of the NDZ designation, how to properly comply with the designation, and the locations of pumpout services.
- The NDZ designation should be strictly enforced to ensure compliance. Enforcement can include boat inspection to make sure that through-hull valves from boat toilets or holding tanks are sealed shut and that Y-valves direct toilet waste into holding tanks.

♦ *Establish practices and post signs to control pet waste problems.Establish equipment requirement policies that prohibit the use of Y-valves on boats on inland waters.*

The U.S. Coast Guard has established equipment requirements for vessels with onboard toilets. Federal law prohibits the discharge of any untreated sewage from boats within the continental waters of the nation, including all rivers and lakes as well as coastal waters out to 3 nautical miles into the ocean. These requirements typically state that vessels must be configured so that the direct discharge of sewage, treated or untreated, to a waterbody is not possible. Only those relatively

Table 4-4. EPA-designated no-discharge zones in the United States (as of 2001).

States with all (or nearly all) waters designated as NDZs:

Michigan, Missouri, New Hampshire, New Mexico, Rhode Island, and Wisconsin

States with segments of their waters designated as NDZs:

California, Florida, Georgia, Massachusetts, Minnesota, New Jersey, Nevada, New York, South Carolina, Texas, and Vermont

Source: http://www.epa.gov/owow/oceans/vessel_sewage/vsdnozone.html

few boats that do travel out beyond the 3-mile limit may use a Y-valve to discharge overboard. The reality, however, is that many boats that never enter the ocean have Y-valves, seacocks, and thru-hulls installed. Most of these are boats built before there were sufficient numbers of pumpouts available. Y-valves (also called "cheater valves") have no purpose other than to bypass the holding tank to avoid using a pumpout. Doing this is clearly illegal and bad for water quality.

As with no-discharge policies, for laws that require specific equipment or configurations on boats to work, sufficient and suitable facilities for disposing of any waste (pumpout services or dump stations) should be available.

Another essential factor that promotes boater compliance is enforcement of regulations. On Lake Winnepeasaukee (New Hampshire), every boat is inspected for having a holding tank and no Y-valve or thru-hull discharge fitting. When a thru-hull fitting is discovered, it must be plugged solid before the boat may be used on the lake. This enforcement has been done successfully for over 30 years by state inspectors at all public launch ramps and by staff in private marinas around the lake.

BMP Summary Table 11 summarizes the BMPs for Sewage Facility Management mentioned in this guidance.

Dramatic improvement in water quality have been recorded where pumpouts have been installed and their use enforced. Water testing in Avalon Harbor (California) and Block Island (Rhode Island) following implementation of no discharge designations revealed significant decreases in fecal coliform bacteria concentrations during the boating season. In Rhode Island, the decrease permitted the opening of a major shellfish bed on Block Island after 13 years of summer closure.

BMP Summary Table 11. SEWAGE FACILITY MANAGEMENT

MANAGEMENT MEASURE: Install pumpout, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access, and post signage to promote use by the boating public.

APPLICABILITY: Marinas where adequate pumpout, dump station, and restroom facilities do not exist.

ENVIRONMENTAL CONCERNS: Boat sewage can be a problem when dumped overboard without any treatment. Although the volume of sewage discharged from boats is not as massive as a typical sewage treatment plant outfall, boat sewage is very concentrated and can add to the overall problem of fecal coliform loading to the waterbody. Boat sewage also adds extra nutrients that use dissolved oxygen and can stimulate the growth of algae, which in worst cases can grow so fast that they use oxygen needed by fish and other organisms. When untreated sewage goes overboard, it can contaminate shellfish, leading to potentially serious human health problems.

SEWAGE FACILITY MANAGEMENT PRACTICES

Best Management Practice Examples	Marina Location & Usage	Benefits to Marina	Projected Environmental Benefits	Initial Cost Estimate	Annual Operation & Maintenance Cost Estimate	Notes
Install pumpout facilities and dump stations. Use a system compatible with the marina's needs	Marina docks and piers; universally recommended	HIGH; matching grant money is available through Clean Vessel Act grant program for installation of pumpout facility; free pumpouts at a marina can attract new customers	HIGH; reduces the chances that untreated sewage will enter the water; results in cleaner water quality and uncontaminated shellfish	MODERATE to HIGH	LOW to MODERATE	Types of systems: fixed point system, portable/mobile system, dump station, or dedicated slipside system; EPA recommends one pumpout per 300 vessels with marine toilets
Provide pumpout service at convenient times and at a reasonable cost	Marina basin; universally recommended	MODERATE; low fees (up to $5) or free service and pumpouts done by marina staff attract customers	HIGH; providing convenient pumpouts encourages use and therefore reduces direct discharge of sewage into nearshore waters	MODERATE to LOW	LOW to MODERATE	Pumpouts should be made available during normal marina hours or when the fuel dock is also open during the boating season
Keep pumpout stations clean and easily accessible, and consider having marina staff do pumpouts	Marina pumpout station; universally recommended	MODERATE to HIGH; pumpout service at a marina can attract new customers, especially when customers do not have to pump their own boats	HIGH; pumpouts reduce direct discharge of sewage into nearshore waters	MODERATE to LOW	LOW to MODERATE	Requires staff training
Provide portable toilet dump stations near small slips and launch ramps	Marina docks and ramps; generally recommended	MODERATE; makes it convenient for boaters to empty their portable toilet and reduces chances of unsightly and unsanitary spills	HIGH; providing convenient portable toilet dump stations encourages use and therefore reduces direct discharge of sewage into nearshore waters	LOW to MODERATE	LOW to MODERATE	One dump station may be all that a drystack or small boat marina needs; use signs to indicate proper dump station use; portable toilets should never be dumped overboard
Provide restrooms at all marinas and boat ramps	Marina dockside; universally recommended	HIGH; clean bathrooms attract customers; marina surveys show that a good restroom is a major reason why boaters select a marina	HIGH; good restrooms get used and reduce boat toilet use, and hence overboard discharge	MODERATE to HIGH	LOW to MODERATE	Clean, dry, convenient restrooms; bright lights and pleasant odor are important

BMP Summary Table 11. (cont.) SEWAGE FACILITY MANAGEMENT

Best Management Practice Examples	Marina Location & Usage	Benefits to Marina	Projected Environmental Benefits	Initial Cost Estimate	Annual Operation & Maintenance Cost Estimate	Notes
Consider declaring marina waters to be a "no discharge" area	Marina-wide; generally recommended	MODERATE to HIGH; such a policy can attract environmentally conscious customers; reduces sewage discharges; increases use of pumpout; good for public relations	HIGH; reduced risk of bacterial water pollution	LOW	NONE	Legally binding slip rental contracts with customers and transient visitors might be required; works best when restrooms are available, pumpouts are available, boaters are educated, signs are posted, and policy is enforced
Establish practices and post signs to control pet waste problems	Dock and upland areas; recommended	MODERATE to HIGH; a marina free of pet waste is more attractive to present and potential customers and will reduce complaints from boat owners	MODERATE; keeps pet waste with harmful bacteria from washing into marina basin	LOW	LOW	The best way to control pet waste is to create a dog walking area away from the shore
Avoid feeding wild birds in the marina	Marina wide; universally recommended	MODERATE to HIGH; keeps marina more free of waste and reduces complaints from boat owners; cleaner docks and boats	MODERATE; reduces harmful in marina basin and on docks and boats	LOW	NONE	The best way to control bird waste is to avoid attracting birds to the marina as a feeding ground
Establish no discharge zones to prevent any boat sewage from entering boating waters	Any boating waters; generally recommended	MODERATE to HIGH; increases pumpout use; creates perception, real or not, that water quality is good	HIGH; significant improvements in water quality have been shown in enforced no discharge zones; areas closed to shellfishing and swimming can be opened	MODERATE to HIGH	MODERATE to HIGH for enforcement and education	EPA and states are responsible for establising NDZs; marina managers can request that the state establish an NDZ
Establish equipment requirement policies that prohibit use of Y-valves on boats on inland waters	Inland boating waters; universally recommended for inland waters	HIGH; the simplest and most effective enforcement tool; allowing this equipment to remain on the boat encourages cheating	HIGH; decreases sewage loading to the waterbody and can help to improve overall water quality in inland lakes and reservoirs	MODERATE to HIGH	MODERATE to HIGH for enforcement and education	This is required on some waters under federal law